Space Weather Forecast

Issued on Friday, 10 November 2023 at 13:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Chance of a G3/Strong geomagnetic storm late 11 or early 12 Nov. Chance of isolated Moderate class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Low with only C-class flares observed in the last 24 hours. There are currently seven regions on the visible disc. AR3483, in the southwest, is the most complex spot on the disk, now with a delta magnetic structure. AR3477, in the southwest remains the largest group, though comparably simpler. The remaining regions are all small, weak and magnetically simple and either stable or gradually decaying.

A large CME left the sun on 09 Nov, which has been modelled to be Earth directed and forecast to arrive at Earth 11 or 12 Nov.

Solar Wind / Geomagnetic Activity: Solar winds showed the waning enhancement from a high speed stream associated with coronal hole 67, falling from Strong to Elevated , around 700 to 550 km/s. The total interplanetary magnetic field strength (Bt) has been weak and consistently between 3-5nT. The north-south component (Bz) varied weakly, and was often negative, between -4 and +4 nT. Geomagnetic activity has been Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) started at background levels, and then increased to moderate levels later in the period, but with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Low solar activity is expected through the period, but with a chance of isolated Moderate class flares. Returning or new regions are likely to rotate onto the visible disc through the period, starting tomorrow, and so the chance of significant flares may increase over the coming days.

Solar Wind / Geomagnetic Activity: An Earth-directed coronal mass ejection is expected to arrive during second half of 11 Nov or early on 12 Nov. This may bring strong solar winds speeds. Otherwise, the solar wind regime is expected to continue falling back to slightly elevated before the coronal mass ejection arrival, as the previous coronal hole fast wind continues to wane. A further enhancement from another coronal hole is possible during second half of 12 Nov or on 13 Nov, to elevate solar wind speeds once again, though this is likely to be masked within the coronal mass ejection arrival.

Before the arrival of the coroanl mass ejection, Quiet to Unsettled (Kp 2-3) geomagnetic activity is expected, but with a chance of isolated Active (Kp 4) intervals today, due to residual high speed stream influence. Later on 11 or on 12 Nov the coronal mass ejection from 09 Nov should generate G1-G2/Minor to Moderate geomagnetic storms, with a chance of G3/Strong geomagnetic storms. Following the coronal mass ejection arrival, geomagnetic activity is expected to gradually decline to Quiet to Unsettled (Kp 2-3) levels by the end of the period.

Energetic Particles / Solar Radiation: There is a slight chance that the high energy (greater

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.

than 10MeV) proton flux reaches Minor Storm levels, due to the locations of the regions on the disc that are most likely to produce significant flares, and also because of the current slight enhancement in the high energy proton flux.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	70	90	30
Strong	G3	No	1	30	30	1
Severe	G4	No	1	5	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	20	20	20
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.